

WHAT IS CLAIMED IS:

- 1 1. A coded microcarrier having immobilized on its surface a plurality of quenched, labeled
2 signaling hairpin molecules each comprising an interacting affinity pair separated by a
3 linking moiety, one member of the affinity pair having bound thereto at least one
4 fluorophore and the other member of the affinity pair having bound thereto at least one
5 quencher, wherein interaction of the affinity pair of each hairpin molecule is disruptable
6 by a physical or chemical change in a condition of its environment, wherein the
7 disruption of the interaction of at least one affinity pair occurs at a first level of said
8 condition and the disruption of the interaction of at least another affinity pair occurs at a
9 second level of said condition, and where said disruptions are optically differentiable.
- 1 2. A microcarrier according to claim 1 wherein said affinity pair comprises complementary
2 nucleotide sequences
- 1 3. A microcarrier according to claim 2 wherein said linking moiety is an oligonucleotide
2 sequence
- 1 4. A mixture of a plurality of coded microcarriers according to claim 1 suitable for use in a
2 distributed microarray, wherein the individual microcarriers each have immobilized
3 thereon a capture probe and wherein the coding scheme for identifying individual
4 microcarriers in said mixture comprises a combination of from three to eight spectrally
5 deconvariable fluorophores and at least three affinity pairs disruptable at detectably
6 different levels of said condition.
- 1 5. The mixture according to claim 4, wherein said affinity pair comprises complementary
2 nucleotide sequences.
- 1 6. The mixture according to claim 4 wherein individual microcarriers are immobilized at the
2 ends of fibers in a fiber-optic bundle.
- 1 7. The mixture according to claim 4 which contains a plurality of identically coded
2 microcarriers having immobilized thereon the same capture probe.

- 1 8. The mixture according to claim 4 wherein the capture probes are molecular beacon
2 probes.
- 1 9. A hybridization assay for a multiplicity of nucleic acid sequences in an analyte utilizing a
2 mixture of claim 4, including steps of:
- 3 a) contacting said mixture and said analyte,
4 b) forming a distributed array of said microcarriers,
5 c) determining which microcarriers have capture probes hybridized to nucleic acid
6 sequences of said analyte, and
7 d) optically decoding said microcarriers to identify the sequences of their capture
8 probes.
- 1 10. The assay according to claim 9 wherein step a) precedes step b).
- 1 11. The assay according to claim 9 wherein the step of decoding includes disrupting said
2 affinity pair by increasing temperature.
- 1 12. The assay according to claim 9 wherein the step of decoding includes disrupting said
2 affinity pair by addition of a denaturant.
- 1 13. The assay according to claim 9 wherein said distributed array is a planar array.
- 1 14. The assay according to claim 13 wherein the planar array comprises microcarriers
2 affixed to the ends of fibers of a fiber-optic bundle.
- 1 15. The assay according to claim 9 wherein said distributed array is a linear array.
- 1 16. The assay according to claim 15 wherein steps c) and d) include flow cytometry.